

of molecular currents in the median streams of revolving electrons the motions of which are acted upon by, and react upon, the magnetic forces of the impressed field, while the second hypothesis is that of the Hall effect, in consequence of which an electron thrown into vibration in a magnetic field experiences a force depending on its own velocity and on the strength of the field. The results of the theory are applied to the discussion of the magneto-optics of sodium vapour, taken from a paper by Prof. Wood himself, and also to an explanation of the Zeeman effect.

Chapters on the laws of radiation, the scattering of light, the nature of white light, and the relative motion of ether and matter conclude the book. In connection with this last subject, Prof. Wood points out that all experimental evidence, with the exception of the well-known Michelson-Morley experiment, is in favour of the hypothesis of a stagnant ether, and that the only explanation of this discrepancy, so far as we can see at present, is that due to Fitzgerald and to Lorentz, that a change is produced in the linear dimensions of matter by its motion through the ether.

Sufficient perhaps has been written to show that Prof. Wood has placed students under a considerable debt by the publication of this book, while the publishers are to be congratulated on the manner in which they have produced it.

RESEARCHES IN JAPANESE WATERS.

Ostasienfahrt: Erlebnisse und Beobachtungen eines Naturforschers in China, Japan, und Ceylon. By Dr. Franz Doflein. Pp. xiii+511. (Leipzig: Teubner, 1906.) Price 13 marks.

DR. DOFLEIN adds one more to the long list of books which have been written to give popular accounts of scientific expeditions. In the year 1904 he undertook a journey to the Far East for zoological purposes, and particularly with the object of investigating the fauna of Japanese waters, which is of peculiar interest, not only as possessing remarkable forms of its own, but as containing an admixture of genera belonging respectively to the cold northern seas and to the Indo-Pacific region, which meet in that locality, with a large "deep-sea" element. In the book before us we have a record of the observations and results of this voyage, and of the impressions made on the traveller by the countries he passed through.

The outward passage was an eventful one. In the Red Sea the *Prinz Heinrich*, on which Dr. Doflein had left Naples, was stopped and searched by the notorious Russian auxiliary cruiser *Smolensk*, and the mails were taken from her. The incident was made more exciting by the presence on board of high Chinese and Japanese officials, and created considerable commotion in Europe at the time. Further trouble, however, awaited the *Prinz Heinrich*. Off Dondra Head, in a heavy sea which would probably have sunk her boats if they had been launched, she

struck some unseen object, sprang a leak, and only reached Galle Harbour just in time to escape sinking. Her passengers were then transferred to the *Poly-nisien*, on which they continued their voyage from Colombo, and arrived, after a further mishap in the shape of a breakdown of the engines, at Saigon. From this town, with the beauty of which Dr. Doflein was more struck than with its morals, he travelled by Hong Kong, Macao, Canton, and Shanghai, where he heard of the defeat of the Russian fleet and saw the interned *Askold* in dock, to Nagasaki, and thence by Yokohama and Tokio to Sendai Bay, in the Rikuzen district on the east coast, where his work was to begin.

The reason which had led Dr. Doflein to choose this locality for his investigations was that on the east coast of Japan the warm current known as the Kuro Siwo, or Japan coast current, derived from the north equatorial drift, meets the cold Kurile current from the north on more or less equal terms, and that therefore in this region the relations of the Indo-Pacific and northern faunas might best be studied. On the western side of the islands the Tsushima current, an offshoot of the Kuro Siwo, appears to have little influence on the temperature of the water, which, so far as is known, has here a more predominantly subarctic fauna. The result of the investigations at Sendai was to show that there is no sharp boundary between the southern and northern faunas, and there is evidence that the change from the one to the other is gradual, and takes place all along the east coast of Japan. This is probably due to the fact that the two currents interlace in a complicated manner and change their position with the time of year. Our knowledge of these currents is largely owing to the work of the unfortunate Admiral Makaroff, who perished off Port Arthur. Dr. Doflein's stay in Sendai was brought to an end by bad weather, and he then left for Sagami Bay in the south, where he made his headquarters at Aburatsubo in a small marine laboratory belonging to the University of Tokio.

The fauna of Sagami Bay is extraordinarily rich, probably on account of the abundant food supply owing to the mortality among the surface organisms of the two currents in consequence of the change of temperature when they meet. It has been collected by many naturalists from von Siebold onwards, and Dr. Doflein wisely gave his chief attention not so much to collection as to the observation of the habits and mutual interdependence of the animals, both of the deep and shallow waters. He describes his impressions of the latter in a graphic chapter, and makes some interesting remarks on the meaning of their coloration. There seems to be a large tropical element, brought, no doubt, by the Kuro Siwo. After some weeks' investigation of the shallow-water fauna, Dr. Doflein returned to Tokio to hire a small steamer for deep-water work. The first vessel that he chartered sank off Misaki, near Aburatsubo, and thus wasted precious weeks of fine weather, but with another he was able to do good work, both on the

plankton and on the ground-fauna at various depths down to about 900 fathoms. Much material was also obtained for him by Japanese deep-sea fishermen with "Dabo" lines.

In summer the warm Kuro Siwo waters cover the surface of Sagami Bay, but in winter the north-west winds bring down the cold current to overlies it, so that the self-registering thermometers reveal a layer of warm water between two cold layers. In this warm layer the fauna of the Kuro Siwo is found, while the surface layer has a very different and largely vegetable plankton. As has been said, there is great mortality among both these sets of organisms, with the result that the ground-fauna at all depths, from tide-marks downwards, is extraordinarily rich. The broken nature of the sea-bottom, providing a greatly increased surface and variety of habitat, no doubt contributes to the same result. Another peculiarity of the fauna of Sagami Bay is the appearance in very moderate depths, of sometimes as little as fifty fathoms, of forms which have usually been found considerably lower, at 500 fathoms to 1500 fathoms. Doflein accounts for this partly by the suitably low bottom temperature, but more by the stillness of the water. Many of the so-called deep-sea forms are, he says, more properly still-water forms, specially adapted to absence of motion rather than to the other peculiar conditions of the deep sea, and their vertical range would probably be found to be considerably greater were the same attention to be paid to the exploration of intermediate depths that has been given to the investigation of the shore-belt and the deep sea. This surmise appears extremely plausible.

Bad weather and accidents to his apparatus brought the investigations once more to a standstill, and Dr. Doflein left Japan. On his way home he stayed in Ceylon, and he gives an interesting account of his researches on fungus-growing termites there. Some remarks on the spinning ant (*Ecophylla*) bring the book to a close. We have read it with great pleasure. The scientific portions are in places very suggestive, the chapters on the ways and customs of various countries, and especially of Japan, are bright and attractive, and the numerous illustrations are often really beautiful.

L. A. B.

BIRD BOOKS FOR BEGINNERS.

- A *Handbook of British Inland Birds*. By Anthony Collett. With coloured and outline plates of eggs by Eric Parker. Pp. xix+289. (London: Macmillan and Co., Ltd., 1906.) Price 6s.
- A *Pocket-book of British Birds*. By E. F. M. Elms. Pp. viii+150. (London: West, Newman and Co., 1906.) Price 2s. 6d.

IF in these days the way is not made smooth for the young ornithologist it is not for lack of books written in his interest. Mr. Collett thinks that there should be a useful place for a book in which the space gained by omitting the sea and shore birds is devoted to a closer account of the inland species, and the chief

intention of his handbook is to supply as plain and simple a means as possible for the identification of those birds, and their nests and eggs, which are to be met with in the inland districts of this country, and are therefore more likely to cross the path of the greater number of persons interested in bird life. Knowing his birds thoroughly well, the author has written most charming and interesting accounts of them, and his long experience of them in the field has enabled him to introduce into his sketches much of the individual character and temperament of each species—those little peculiarities a knowledge of which is only to be gained by long acquaintance, and by which the old hand knows his birds at a glance or by a note heard in the distance. When the object is to teach the beginner in the study this intimate knowledge is very necessary, and all birdmen (who will read the book for the pleasure it will give them) will recognise and appreciate the happy touches of description which arise from it.

As the book will, we think, be in some demand, we offer a few suggestions in view of another edition. To give the salient features of the general appearance of a bird as seen at a little distance should not be difficult, but the descriptions here, in many cases, seem to be hardly sufficient. The fieldfare, for instance, is merely differentiated from the missel thrush (in plumage) as having a more distinct grey patch on the lower part of the back; whereas its greyish head, rich brown mantle, and the blue-grey of the patch on its lower back (from which the bird is sometimes called the "pigeon" felt) might have been pointed out as sufficiently apparent to serve as identification marks. The short wings of the sparrowhawk might have been alluded to, as well as the want in the curl bunting of the bright chestnut rump so conspicuous in the yellow hammer; the distinctly colder tints easily seen in life of the marsh compared with those of the reed warbler, and the streaked under parts of the adult Montagu's harrier are merely further instances of the kind of recognition marks we wish to indicate.

As the book is intended for readers whose knowledge of ornithology is of an elementary character, something more about the plumage of the chaffinch than the statement that the hen bird is a good deal duller than the cock is desirable, and the want of it is all the more felt, because the following species, the brambling, is said rather closely to resemble the chaffinch, and is described in comparison with it. The whitethroat is described as if it were uniformly coloured on the upper parts, whereas the greyish head contrasts with its rufous-brown back; and as we are dealing with birds seen at a little distance, it would have given a better idea of the cock stonechat to say that he had a black head than that he had a conspicuous black patch on the throat and face. We should not have said that the pied flycatcher had the appearance of being of slender build, nor can we detect that the eggs of the whinchat are usually a good deal greener and deeper in tint than ordinary hedge-sparrows' eggs. The author thinks